



CHRONIC CRITICAL ILLNESS: UPDATES TO WEANING OUTCOMES AT A REGIONAL WEANING CENTER WITH SELECTED SUBPOPULATION REPORTING



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INTRODUCTION

For more than three decades, patients who fail to wean in the critical care setting, becoming dependent on mechanical ventilation, have been transferred to long-term care hospitals for continued attempts at weaning from prolonged mechanical ventilation (PMV). Barlow Respiratory Hospital (BRH) is a 105-bed long-term acute care (LTAC) hospital network that serves as a regional weaning center, accepting chronically critically ill (CCI) patients transferred from the ICUs of hospitals in southern California. Herein we report updates to patient characteristics, weaning outcomes, and discharge disposition from our Ventilation Outcomes Database (VOD), a performance improvement database. In addition, we report on five subpopulation cohorts of interest. We also display six-year trending of selected demographic and outcome variables.

METHODS

Data were abstracted by trained personnel from transfer documents and BRH medical records of all adult ventilator-dependent patients receiving invasive mechanical ventilation admitted for weaning. Custom queries were constructed to obtain electronic medical record (EMR) data. Pre-morbid functional status was determined using the Zubrod Score (0 = Fully active to 4 = Bedridden with no self-care). Zubrod scores of 0-2 were deemed "good" functional status; scores of 3-4 were "poor" functional status. Outcomes (weaned, ventilator-dependent, died) were scored at BRH discharge; weaned was defined as patient free of invasive mechanical ventilation at least one full calendar day prior to day of discharge. Time to wean (days) was tallied from day of admission through last day of ventilator support.

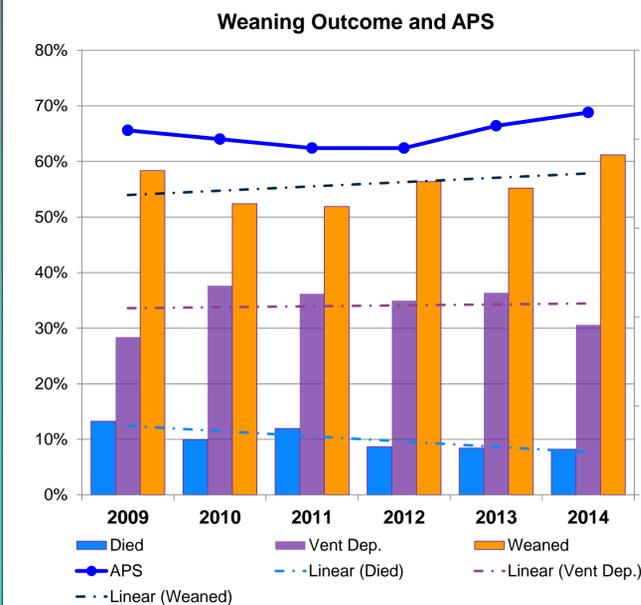
RESULTS

From 1/1/10 to 12/31/2014, 1,395 patients admitted for weaning were discharged from BRH. Trend analysis employs data of 1,730 patients discharged from 1/1/09 to 12/31/14.

Table 1

Variable	Admission Characteristics, Weaning Outcomes, Discharge Disposition (2010-2014)					
	All patients admitted for vent weaning N=1,395	Pre-morbid location, ECF n=410 (30%)	Pre-morbid functional status, Poor n=587 (42%)	Age ≥ 85 years n=223 (16%)	Hemodialysis n=176 (13%)	
					Prior to admission n=113 (64%)	After Admission n=63 (36%)
Age, years	73.1 [17 - 101]	74.8 [21 - 100]	74.4 [21 - 101]	88.9 [85 - 101]	72.1 [17 - 99]	80.7 [42 - 100]
Gender, male	51%	51%	48%	41%	56%	46%
Medicare	75%	83%	81%	96%	78%	86%
Ethnicity	N(%)	n(%)	n(%)	n(%)	n(%)	n(%)
African American	139 (10.0)	49 (12.0)	77 (13.1)	11 (4.9)	11 (9.7)	6 (9.5)
Asian/Pacific Islander	127 (9.1)	42 (10.2)	61 (10.4)	23 (10.3)	13 (11.5)	5 (7.9)
Caucasian	811 (58.1)	218 (53.2)	307 (52.3)	146 (65.5)	57 (50.4)	31 (49.2)
Hispanic	290 (20.8)	91 (22.2)	129 (22.0)	39 (17.5)	32 (28.3)	18 (28.6)
Other/Missing/Unknown	28 (2.0)	10 (2.4)	13 (2.2)	4 (1.7)	--	3 (4.8)
Pre-morbid Location						
Home	70.5%	--	36.5%	57.8%	75.2%	66.1%
ECF	29.5%	100%	63.5%	42.2%	24.8%	33.9%
Pre-morbid Zubrod						
"Good" Functional Status	57.7%	9.0%	--	45.3%	61.9%	51.6%
"Poor" Functional Status	42.3%	91.0%	100%	54.7%	38.1%	48.4%
LOS Transferring Facility, days	22 [1 - 741]	15 [1 - 384]	17 [1 - 384]	22 [1 - 384]	25 [1 - 741]	19 [3 - 244]
Pressure Ulceration ≥ Stage II	51.3%	60.7%	60.5%	61.9%	73.5%	71.4%
Multiple Pressure Ulcerations	21.3%	30.5%	29.3%	28.3%	39.8%	27.0%
APACHE III[®] APS	40 [7 - 111]	43 [8 - 93]	43 [8 - 111]	46 [10 - 93]	62 [32 - 97]	47 [24 - 84]
Glasgow Coma Score	14 [3 - 15]	12 [3 - 15]	13 [3 - 15]	12 [3 - 15]	14 [3 - 15]	12 [3 - 15]
Lab Values	<i>Mean ± SEM</i>					
Serum Albumin (g/dl)	2.41 ± 0.02	2.36 ± 0.03	2.35 ± 0.03	2.23 ± 0.04	2.72 ± 0.08	2.3 ± 0.08
Hematocrit (%)	30.4 ± 0.12	29.67 ± 0.21	30.07 ± 0.17	29.78 ± 0.25	28.92 ± 0.37	28.96 ± 0.53
BUN (mg/dl)	33.74 ± 0.68	32.97 ± 1.21	34.07 ± 1.06	39.56 ± 1.9	63.21 ± 3.30	56.68 ± 3.81
Creatinine (mg/dl)	1.07 ± 0.03	1.05 ± 0.05	1.08 ± 0.05	1.02 ± 0.06	3.69 ± 0.20	1.72 ± 0.15
Weaning Outcome	N(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Weaned	772 (55.3)	213 (52.0)	289 (49.2)	95 (42.6)	42 (37.2)	12 (19)
Vent Dependent	491 (35.2)	160 (39.0)	241 (41.1)	94 (42.2)	55 (48.7)	29 (46)
Died	132 (9.5)	37 (9.0)	57 (9.7)	34 (15.2)	16 (14.1)	22 (34.9)
Time to Wean, days	16.4 [1 - 130]	17.1 [3 - 90]	17.1 [1 - 90]	17.0 [3 - 82]	19.8 [2 - 130]	53.3 [21 - 94]
LOS, days	35 [1 - 339]	35.0 [4 - 296]	36.0 [3 - 296]	37.0 [3 - 243]	41.0 [5 - 290]	65.0 [11 - 296]
D/C Disposition	N(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Acute	176 (12.6)	34 (8.3)	56 (9.5)	25 (11.2)	33 (29.2)	15 (23.8)
ECF	963 (69)	331 (80.7)	431 (73.4)	155 (69.5)	59 (52.2)	26 (41.3)
Home	121 (8.7)	8 (2.0)	43 (7.3)	9 (4.0)	5 (4.4)	--
AMA/Missing	3 (0.2)	--	(--)	(--)	--	--
Expired	132 (9.5)	37 (9.0)	57 (9.7)	34 (15.2)	16 (14.2)	22 (34.9)
Live Discharges	1,263 (90.5)	373 (91.0)	530 (90.2)	189 (84.7)	97 (85.8)	41 (65.1)

Figure 1



COMMENTS, CONCLUSIONS, LIMITATIONS

This is an update of recent post-ICU mechanical ventilation patient characteristics, weaning outcomes, and discharge disposition with an interesting look at five distinct subpopulation cohorts. Although formal comparison analyses were not performed, there appear to be clear differences in demographics and outcomes among the subpopulations. These differences are not surprising based on the cohort determination criteria.

As more patients survive the ICU experience to become chronically critically ill, and more survive to discharge from the LTAC hospital, determination of patient location, ventilator status, readmission rates, long-term survival, quality of life and functional status become increasingly important considerations and challenges for all stakeholders. Identification and adjustment for variation in patient outcomes that stem from differences in patient characteristics (or risk factors) may better inform these considerations.

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